81849

# COGNITIVE–BEHAVIORAL THEORY AND PREPARATION FOR PROFESSIONALS AT RISK FOR TRAUMA EXPOSURE

**JULIA M. WHEALIN**
**JOSEF I. RUZEK**
*National Center for Posttraumatic Stress Disorder*

**STEVEN SOUTHWICK**
*Yale University*

*Military personnel, emergency first responders, and others whose work environments include exposure to traumatic events are at risk for developing posttraumatic stress disorder (PTSD). To help prevent negative sequelae, there is a strong need to identify well-operationalized, empirically supported, theoretically framed models of healthy adaptation to potentially traumatic events. Cognitive–behavioral theories (CBTs) describe etiological factors in trauma, guide research that has identified risk for PTSD, and help develop interventions that can effectively reduce posttrauma symptomatology. In this article, the authors draw on CBT and empirical research on posttraumatic stress to propose possible cognitive–behavioral mechanisms in trauma adaptation. They then suggest directions for future research, including areas for prevention interventions for at-risk professionals.*

**Key words:** *stress; trauma; prevention; preparation; intervention; cognition; behavior*

INDIVIDUALS WHOSE OCCUPATIONS PLACE THEM at risk for exposure to potentially traumatic events (PTEs) involving physical injury, death, and/or the witnessing harm to others often report high levels of posttrauma sequelae (e.g., van der Ploeg, Dorresteijn, & Kleber, 2003). Of soldiers deployed to Iraq, for instance, 23% reported moderate to severe combat-related stress reactions while in the war zone (U.S. Army, 2003), and 19% to 20% of Marines serving in Iraq reported significant levels of posttraumatic stress symptoms following their return to the United States (Hoge et al., 2004). In other studies, 30% of humanitarian aid workers (Eriksson, Vande Kemp, Gorsuch, Hoke, & Foy, 2001) and 34% of police officers (Carlier, Lamberts, & Gersons, 1997) reported significant posttraumatic stress disorder (PTSD)

AUTHORS' NOTE: Portions of this article were presented at the 22nd annual International Society of Traumatic Stress conference, November 2006.

TRAUMA, VIOLENCE, & ABUSE, Vol. 9, No. 2, April 2008 100-113
DOI: 10.1177/1524838008315869

## KEY POINTS OF THE RESEARCH REVIEW

- Exposure to work-related trauma appears to place many employees at risk for stress-related problems that can become chronic mental health disorders and impair performance of key life roles.
- On the level of the community, social epidemiological theoretical models have been used to identify public health models of resilience.
- On the level of the individual, resilience factors have been proposed to distinguish who does well following an event from who does poorly. However, many resiliency constructs are not well defined and have yielded few theoretical guidelines for improving posttrauma outcomes.
- When examining individual factors, there are several reasons to examine the role of cognition and behavior in posttrauma outcomes.
- Longitudinal research is needed to examine the cognitive–behavioral mechanisms and processes that individuals use prior to, during the course of, and following potentially traumatic events.
- Research is needed to evaluate systematized preevent preparation programs for specific worker populations, work environments, job-specific potentially traumatic events, and individual and group characteristics.

symptoms postduty. In a study of U.S. and Canadian firefighters, 22% and 17% met screening criteria for PTSD, respectively (Corneil, Beaton, Murphy, Johnson, & Pike, 1999). Of firefighters who took part in rescue efforts following the Oklahoma City bombing, 13% met criteria for PTSD (North et al., 2002), and many firefighters who took part in the 9/11 rescue efforts in New York City did not return to their occupation because of trauma-related disorders (Centers for Disease Control and Prevention, 2002). Thus, exposure to work-related trauma continues to place a portion of employees at risk for stress-related problems that can become chronic mental health disorders and impair performance of key life roles.

On the level of the community, social epidemiological theory has been used to identify public health models of resilience. For example, the Haddon matrix model (Runyan, 1998) has been used to identify strategies for intervention for the entire population (primary prevention), for those who are particularly at risk (secondary prevention), and for those actually affected by an event, following that impact (tertiary prevention). This article focuses on secondary prevention interventions for professionals at high risk for PTSD. Although most professionals who deal with potentially traumatic situations are embedded in organizational or community networks designed to promote healthy recovery, we propose that additional interventions are needed for those at highest risk for PTSD.

The most robust risk factor for PTSD following a PTE is the "dose"—the intensity, severity, or number—of the exposure or exposures (e.g., Smith, Perrin, Yule, & Rabe-Hesketh, 2001). PTSD prevention ideally would consist of making the world a safer place by limiting war, violence, accidents, and disaster. Unfortunately, however, these events are inevitable parts of the human experience, exposure to which remains likely for those in particularly high-risk occupations. In addition, we find that many other risk factors, including gender, race, age, history of trauma, and history of mental illness (Andrews, Brewin, & Rose, 2003), are static factors not amendable to change. The best we can do to help those most at risk for unavoidable trauma is examine what mechanisms and processes separate those who develop posttrauma sequelae from those who do not and use that knowledge to inform interventions to promote resilience.

Resilience is the capacity of individuals or groups to implement early, effective adjustment processes to alleviate strain imposed by stress exposure (Layne Warren, Watson, & Shalev, in press). The literature is replete with studies that describe individual factors related to resilience to PTEs. For instance, individuals resilient to adverse events are more likely to have personality dispositions such as extraversion (Chung, Easthope, & Chung, 1999; Riolli, Savicki, & Cepani, 2002), optimism (Afflect & Tennen, 1996), and "hardiness" (Bartone, Ursano, & Wright, 1989; L. A. King, King, Fairbank, Keane, & Adams, 1998). Resilient individuals report stronger social bonds and more social resources during stress than do those who develop PTSD (Butler et al., 2002; Garmezy, Masten, & Tellegen, 1984; Gribble et al., 1993). In addition,

some individuals seem to physiologically adapt and rebound from the impact of stress more quickly than do others (see Friedman, 2002; McEwen, 2003; Morgan et al., 2001).

To date, however, identification of these individual resiliency constructs has yielded few theoretical guidelines for improving posttrauma outcomes. Layne and colleagues (in press) have criticized the resilience constructs, such as hardiness and optimism, as being conceptually imprecise. Although examining individual differences between "resilient" and "nonresilient" groups has provided helpful information about correlates of good outcomes following PTEs, such research does not explain what underlying mechanisms actually protect individuals from harm (Layne et al., in press; Masten & Coatsworth, 1998). Furthermore, many "resilience" programs that have been developed are primarily based on speculation rather than theories (Layne et al., in press). Interventions based on these factors will not promote resilience if such constructs are the result of resilience rather than a cause of it (Masten & Coatsworth, 1998). Thus, to assist in explaining the mechanisms of trauma adaptation, to predict which subgroups may be at elevated risk for PTSD, and to guide the development of preparation programs, there is a need to identify and examine specific variables that causally influence outcomes.

There are several reasons to examine the role of specific aspects of cognition and behavior in determining posttrauma outcomes. First, as we explore in the next section, there is a well-developed theoretical basis for cognitive–behavioral (CB) etiological factors in traumatization. Second, CB definitions of traumatization are rather precise, allowing us to elucidate the mechanisms at play and operationalize independent variables for prevention studies. Third, interventions based on CBT have shown success in addressing posttrauma sequelae (e.g., Bryant, 1999; Foa, Ehlers, Clark, Tolin, & Orsillo, 1999; Resick, Nishith, & Weaver, 2002). Fourth, such CB interventions have been shown to be effective across various ethnic and international groups, suggesting that the processes addressed in the interventions are not culturally based (e.g., Marsella, Friedman, & Gerrity, 1996). Last, empirical studies have begun to identify CB factors that discriminate between those who develop PTSD and those who do not. For example, those exposed to PTEs show individual differences in factors such as perceived control (Kuch, 1989), self-efficacy (Ginzburg, Solomon, Kekel, & Neria, 2003), appraisal style (Bryant & Guthrie, 2005; Masten, 2001), and postevent coping behavior (D. W. King, King, Foy, Keane, & Fairbank, 1999; Sharkansky et al., 2000).

In this article, we explore ways of promoting healthy adaptation to unavoidable PTEs in those workers who are most at risk for exposure. We draw on etiological models of traumatic stress response to explain how cognition and behavior in the peri-trauma period may influence adaptation to PTEs. Many studies have investigated CB mechanisms associated with traumatization and posttrauma sequelae. We briefly review this empirical research to identify CB factors that are theorized to be key determinants in the etiology of PTSD. We hypothesize that interventions targeting those mechanisms can help minimize the impact of PTEs. We then propose theory-driven interventions that might be developed as part of a research program designed to help protect workers against poor posttrauma outcomes.

## CB MODELS OF TRAUMA RESPONSE

### *Perceptions of Control and Self-Efficacy*

Animal models of severe stress suggest that the more predictable and controllable a stressor is, the less likely it is to lead to the development of pathology (Foa, Zinbarg, & Rothbaum, 1992). Predictability is thought to be helpful in part because a signal allows the organism to generate responses that alter the impact of an event, thus providing a sense of control over the perceived intensity of the event. Research suggests that when the onset of danger is unpredictable, contextual stimuli are more likely to be subsequently treated as predictors of aversive events, leading to greater generalized fear (Mineka &

Zinbarg, 2006). However, when an organism has some control over the aversive stimulus, generalization of fear to the context is inhibited. Such animal models are supported by studies in humans demonstrating that participants shown pictures of dead bodies who could predict and control onset of the stimuli by turning off the slides showed less stress arousal during slide viewing than did those who could only predict onset (Geer & Maisel, 1972). These findings are also consistent with Kuch's (1989) report that passengers in motor vehicle accidents were more likely to develop postaccident psychopathology than were drivers (who theoretically would have more control over the situation).

Bandura's (1989) social cognitive theory also emphasizes perceptions of control. The theory maintains that people's appraisals about their own capabilities to manage events (referred to as coping self-efficacy) are central determinants of behavioral and affective responses to situations. Some researchers (e.g., Dunmore, Clark, & Ehlers, 1997; Tomaka, Blascovich, Kelsey, & Leitten, 1993) have argued that individual differences in coping self-efficacy are key factors in the development of PTSD. In a recent prospective study of 400 Israeli war veterans, low perceived self-efficacy prior to combat was correlated with PTSD following combat (Ginzburg et al., 2003). Basoglu et al. (1994) hypothesized that a major predictor of the long-term impact of torture may be the individual's tendency to fight back and thereby maintain a sense of efficacy. In fact, research with survivors of political imprisonment and assault has indicated that "mental defeat" (i.e., losing one's sense of coping self-efficacy) during such PTEs is related to development of PTSD (Dunmore, Clark, & Ehlers, 2001; Ehlers, Maercker, & Boos, 2000).

Perceived self-efficacy is also one key factor in the personality construct termed *hardiness* (Kobasa, 1979; Kobasa, Maddi, & Kahn, 1982), which is consistently correlated with absence of PTSD in survivors of PTEs (e.g., Bartone, 1999; D. W. King et al., 1999). Self-efficacy increases feelings of controllability in situations that appear uncontrollable. In addition, high self-efficacy is associated with positive emotions (Folkman & Moskowitz, 2000). High self-efficacy during stress has been correlated with lower distress, less autonomic arousal, and lower plasma catecholamine secretion (Bandura, Reese, & Adams, 1982; Bandura, Taylor, Williams, Mefford, & Barchas, 1985). It is interesting that one study showed that strengthening of coping efficacy prior to exposure ameliorated the psychological and biological stress reactions to a previously upsetting stressor (Bandura et al., 1982).

### *Positive and Negative Cognitive Appraisals*

Individuals who appraise a PTE and/or its implications in excessively negative ways are also more likely to develop trauma-related psychopathology (Ehlers & Clark, 2000; Resick & Schnicke, 1993). A study of firefighters (Bryant & Guthrie, 2005) showed that those who had fewer negative beliefs prior to service were less likely to have PTSD after the 1st year on the job. Positive beliefs, alternatively, seem to predict resilience to PTEs (Masten, 2001). The ability to cognitively reappraise stressful events is associated with positive emotions (Folkman & Moskowitz, 2000). Resilient individuals report experiencing more positive emotions during stressful events (Fredrickson, 2001), which has been associated with positive meaning making and with accelerated cardiovascular recovery from negative emotional arousal (Tugade, 2004). Research on explanatory style has suggested that appraisals about the causes of external events will be major determinants of emotional reactions to those events (Seligman, Abramson, Semmel, & von Baeyer, 1979; Seligman et al., 1988). Some evidence suggests that emotions of guilt and anger, often driven by negative appraisals (e.g., the belief that one is responsible for the death of another person), are strongly associated with PTSD symptoms (Riggs, Cahill, & Foa, 2006).

Alternatively, positive appraisals in the face of adversity is associated with resilience (Eid & Morgan, 2006; Southwick, Vythilingam, & Charney, 2005). For example, individuals who are able to find positive meaning within stressful situations are better able to justify any hardships or sacrifices they make (Basoglu et al., 1997; Litz, King, King, Orsillo, & Friedman,

1997). Research indicates that those who report positive meaning are less likely to develop posttrauma sequelae (Basoglu et al., 1994; Himelein & McElrath, 1996; Sutker, Davis, Uddo, & Ditta, 1995; Tugade, 2004).

### Physiological and Emotional Arousal

The intense physiological and emotional arousal often experienced during and immediately following trauma exposure is thought to affect cognitive processes important in the etiology of PTSD. Ehlers and Clark (2000) have noted that traumatic memories encoded during states of extreme fear arousal tend to be poorly processed (integrated with existing knowledge and memories), likely because of a lack of sustained attention, verbal processing, and/or poor integration with existing knowledge. Memories that are not consciously processed are more likely to be experienced as frightening and uncontrollable intrusive images and affective responses (Brewin, Dalgleish, & Joseph, 1996). This may explain why interference with conscious processing of a PTE, such as by dissociation, is associated with higher likelihood of PTSD (e.g., Bryant, Marosszeky, Crooks, & Gurka, 2004; Marmar, Weiss, Metzler, Ronfeldt, & Foreman, 1996).

Intense physiological and emotional arousal also seems to be associated with fear conditioning in PTSD (Foa, Steketee, & Rothbaum, 1989; Keane, Zimering, & Caddell, 1985; Lovibond, 2006). Fear conditioning involves the pairing of a fear-eliciting aversive stimulus (unconditioned stimulus [US]) with an explicit neutral stimulus (conditioned stimulus [CS]) that then comes itself to elicit a conditioned emotional response. For example, if a sound is paired with an aversive stimulus such as a shock, eventually the sound by itself (in the absence of the shock) can elicit fear and fear-related physiological responses. Similarly, if a combat warrior survives an attack by a deafening improvised exploding device (US) in which his or her other unit members are killed, he or she may react with fear and panic when he or she hears a loud noise after reentering civilian life. Contextual stimuli that were present at the time of the CS, but which were not directly associated with it, can also acquire the capacity to evoke a conditioned response (Bolles & Fanselow, 1980; Foa et al., 1992). For example, if the explosion occurred on a hot and dusty day, similar climate conditions, encountered even many years later in locations distant from the original blast, can trigger unwanted memories of the event and evoke strong emotional reactions (Southwick, Bremner, & Krystal, 1994).

### Postevent Coping

Individuals who develop PTSD generally show strong avoidance coping responses to reminders of the PTE (American Psychiatric Association, 2000). Because conditioned traumatic reactions to trauma-related stimuli are unpleasant and distressing, avoidant coping can temporarily decrease anxiety and fear. Over time, this avoidant behavior becomes positively reinforced and habitual. In the long run, avoidant coping interferes with any opportunities to learn that the CS is not dangerous, perpetuating fear conditioning. Indeed, research has shown that those who predominately use avoidance as a coping strategy report higher levels of PTSD symptomatology (Benotsch et al., 2000; Butler et al., 2002; Johnson & Kenkel, 1991; Leitenberg, Greenwalk, & Cado, 1992; Silver, Holman, McIntosh, Poulin, & Gil-Rivas, 2002).

Conversely, individuals who are resilient to PTSD are more likely to engage in adaptive coping strategies such as problem solving, goal setting, stress management, and use of social support (D. W. King et al., 1999; L. A. King et al., 1998; Sharkansky, King, & King, 2000). Such adaptive coping strategies may also promote self-efficacy beliefs during highly stressful situations (Folkman & Moskowitz, 2000).

### Summary

The research on trauma response suggest various CB mechanisms may be at work during adaptation to PTEs (see Table 1). These variables are located in three interacting response systems: cognitive responses, physiological responses, and behavioral actions. We propose there are several broad ways that CB mechanisms can influence the adaptation to

PTEs. In this article, we focus on those mechanisms that are likely most amendable to modification prior to exposure to a PTE. We observe that CB mechanisms affect several areas key to traumatization in the peri-trauma period. These include perceptions of control and self-efficacy, physiological or emotional arousal, and coping behavior. Below, we propose specific interventions that might be included in a pretrauma preparation research program.

## POSSIBLE TARGETS FOR PREPARATION RESEARCH EFFORTS

Methods to prepare employees for PTEs have received relatively little attention in the scientific literature. Many of these strategies are already in use in some form (e.g., basic training) but could be imparted more efficiently and/or effectively with the addition of CBT conceptualization and strategies. Well-operationalized CB strategies can be embedded in preparation models already in place, such as public health approaches, for those most at risk for poor outcomes.

### *Increasing Perceptions of Control and Self-Efficacy*

Interventions that increase the predictability of aversive stimuli by reducing their unexpectedness would likely increase feelings of control and self-efficacy during PTEs. Interventions that increase the sense of control and self-efficacy include those that (a) increase workers' perceptions of controllability and predictability of potentially traumatic stimuli, (b) address attentional and performance factors, and (c) increase workers' perceptions of controllability and predictability of internal stimuli.

*Increasing perceptions of controllability and predictability of potentially traumatic stimuli.* We know that workers who are new to tasks such as handling dead bodies anticipate higher levels of stress and may be more vulnerable to traumagenic reactions than those who have experience with the task (McCarroll et al., 1995). The unfamiliar and/or unexpected nature of new experiences (e.g., terrorist bombings or the sights and smells of dead bodies) exacerbates the sense of horror and thus increases physiological or emotional arousal.

Several lines of research and theory have suggested that exposing individuals to trauma-related stimuli under controlled conditions can decrease subsequent emotional reactions to these stimuli in real-life situations. Simple prior exposure to a CS before it has been paired with a US reduces the degree of conditioning that takes place when the CS and US are subsequently paired (e.g., Lubow, 1998). For example, children who have had several previous nontraumatic visits to see a dentist are less likely to develop dental anxiety if traumatized at the dentist's office than those who had fewer previous visits (Kent, 1997). This suggests that prior exposure to the contextual environments of PTEs will help prevent subsequent traumatization.

If findings from recent animal learning studies generalize to humans, preventive exposure interventions could be utilized for those at risk for development of psychopathological outcomes (Craske & Mystkowski, 2006; Whealin & Ruzek, 2004).

For example, preparatory interventions using graduated exposure techniques theoretically should help reduce emotional reactions to PTEs, thereby decreasing the degree to which a similar PTE experienced later in the natural environment will evoke an overwhelming affective response. In the case of body handling, graduated exposure to stimuli associated with death (pictures and videos, smells of death, sights of actual cadavers) is used to decrease the novelty and affective arousal associated with the experience. The more closely the stimuli resemble the sights, sounds, and smells of the real-life potentially traumatic work environment, the more effective exposure is likely to be.

In addition to providing exposure-based training, imparting verbal information about what may happen during upcoming events should help decrease the novelty and unexpectedness of PTEs. Such candid preparatory education has been shown to decrease the intensity of emotional responses in subsequent fear-producing events (e.g., Blount, Davis, Powers, & Roberts, 1991; Inzana, Driskell, Salas, & Johnston, 1996). Some research has suggested

that giving anxiety-prone individuals information in advance about potentially feared objects is helpful in preventing anxious psychopathology (Gardenswartz & Craske, 2001).

Although exposure and informational preparation strategies have received little formal evaluation, such efforts have a long history of being used in military training (e.g., Ahrenfeld, 1958, cited in Marks, 1987). Today, various first-responder and military organizations utilize exposure and informational preparation as key training elements (e.g., Morgan, Southwick, Hazlett, & Steffian, 2007). Recent research has provided some information on individual performance differences in response to acute stress during exposure trainings. For example, among military populations, better training performance is associated with higher DHEA-S-cortisol ratios (Morgan et al., 2004) and with lower scores on internal attribution style and propensity to dissociate (Eid & Morgan, 2006).

*Address attentional and performance factors.* Interventions have been developed to increase the sense of control and self-efficacy focused on attention factors and performance. For example, rehearsal of task behaviors during realistic training experiences allows for practice in remaining task-focused during work-related PTEs (Paton, Smith, & Stephens, 1998) and can help decrease the intensity of peri-traumatic distress (Bartone, 1999; Gold et al., 2000). Such interventions in military populations can improve performance, decrease fear, and increase coping self-efficacy (Rachman, 1990). By focusing on the task sequence at hand, attention is directed away from the traumatic aspects of an event, such as attention to the extreme suffering of victims, thoughts of personal helplessness, or personal life threat (McCarroll, et al., 1995).

A related method that may enable individuals to control their degree of exposure to traumatizing stimuli is distraction. Distraction techniques involve a purposeful refocusing of attention away from the threatening aspects of the situation to nontraumagenic thoughts, objects, or events while still remaining alert to the task-related aspects of the event. For example, McCarroll et al. (1995) have implemented a component of this training with body handlers by teaching them to avoid looking at the faces and hands of the dead, parts of the body that have been linked to traumatization. Similarly, Red Cross rescue workers are instructed to focus their attention on one person in need of help at a time, to decrease feelings of helplessness when attending to what can be an otherwise overwhelming number of people in need. Individuals can similarly be instructed to limit unnecessary exposures that are not part of the actual task. For example, individuals might be instructed to limit their viewing of media coverage following a disaster (Pfefferbaum et al., 2003).

Last, some research has suggested that the experience of "mental defeat," or giving up, during a traumatic assault is associated with development of PTSD (e.g., Ehlers et al., 2000). Another strategy that may help individuals to maintain control during PTEs is using strategies of continued resistance and/or mental planning during highly stressful activities. In mock captivity training, for example, mental planning skills have been implemented to help reduce feelings of helplessness and discomfort and increase problem-solving abilities during real-life highly stressful situations (Morgan, Steffian, & Ozbay, 2006).

*Increasing the predictability and controllability of internal stimuli.* As with external stimuli, a sense of unfamiliarity and helplessness with internal emotional and physical stress reactions experienced during a PTE may promote traumatization. Because most individuals have little or no experience with intense physical responses under conditions of danger and aversion (e.g., panic), such overwhelming reactions can contribute to a perception of psychological chaos and uncontrollability. These perceptions, subsequently, can increase the probability of negative outcomes following PTEs (Mineka & Zinbarg, 2006).

To reduce the surprise and/or fear of bodily states (e.g., panic or disorientation) during and after a PTE, such bodily sensations can be duplicated in training. For example, mock captivity training conducted by military special forces elicits many of the potentially disorienting internal physiological stress responses that are known to take place during real-life capture and torture. Symptoms of the disruption

of normal consciousness (i.e., "dissociation") have been reported by 96% of soldiers undergoing such training (Morgan et al., 2001).

Moreover, when internal physical sensations of anxiety precede intense panic experiences (as may occur during traumatization), these sensations can function as conditioned stimuli and themselves come to elicit intense fear and panic (Goldstein & Chambless, 1978; Ohman & Mineka, 2001). Absence of firsthand experience with such extreme physical stress reactions also increases vulnerability to maladaptive interpretations of stress responses (e.g., worry about "going crazy" or beliefs about inability to cope) associated with greater likelihood of developing PTSD (Ehlers & Clark, 2000). Techniques of interoceptive exposure (Barlow, 2002) that deliberately and repeatedly provoke internal hyperarousal sensations could be used to increase familiarity with and reduce fear related to such sensations. In this way, individuals who are sensitive to internal physiological reactions learn that internal stress reactions are unpleasant but tolerable rather than panic inducing (Reiss, 1991).

### Shape Cognitive Appraisals

Individuals exposed to PTEs actively appraise the situation, their reactions, and possible implications of the event. Because cognitive appraisals play a significant role in development and maintenance of stress reactions, we propose that preparatory interventions include interventions designed to (a) "inoculate" individuals against event-specific negative appraisals, (b) identify and remediate cognitive vulnerabilities, and (c) increase adaptive appraisal of mission and task roles.

*"Inoculating" against event-specific high-probability negative appraisals.* In many work-related situations, it is possible to identify common negative cognitions that are associated with specific kinds of work-related PTEs. For example, combat personnel involved in firefights have commonly been troubled by guilt related to beliefs that they are to blame for killing others, that they "allowed" their comrades to be killed, or that they should have "done more." Impressions of performance during war, firefights, or police gun battles tend to overestimate competence, emotional composure, and courage. In reality, the physical and emotional hyperarousal, fatigue, and cognitive confusion that often accompany acute stress can interfere with performance (Berkun, 2000). It is thus important that training help prepare workers for low-success operations. Negative appraisals related to the way individuals felt or acted ("It was my fault." "I was a coward.") can contribute to the high rates of event-related guilt and anger commonly seen in individuals with PTSD (Andrews, Brewin, Rose, & Kirk, 2000; Kubany, 1998). Event-specific negative cognitions can initially be identified, for example, by after-action reports, focus groups, or other research efforts. Shaping of appraisals can be accomplished in part by simple provision of education about adaptive beliefs and attitudes.

*Identifying and reducing cognitive vulnerabilities.* Some individuals, based on learning history, will enter their work roles with attitudes and beliefs that make them vulnerable to developing PTSD over time (Bryant & Guthrie, 2005). Thus, preparation interventions might include screening for individuals' cognitive vulnerabilities, including negative appraisals of themselves, of their internal bodily sensations, of their jobs, and/or of other people. Cognitive therapy interventions could then be developed based on the theoretical framework presented here. In various forms of cognitive therapy (e.g., Resick & Schnicke, 1993), individuals with trauma-related thoughts or beliefs are led through a systematic process designed to help them identify and challenge negative beliefs and find other, more adaptive ways of thinking. Use of similar techniques to cognitively inoculate workers against high-probability negative cognitions is a useful component in a comprehensive preparation program.

Some preventive CB interventions that address explanatory style have been shown to improve depression and/or anxiety. For example, college students identified as at risk for depression and randomly assigned to an 8-week workshop addressing explanatory style had significantly fewer depressive and anxiety symptoms compared to students in the assessment-only control group (Seligman, Schulman,

DeRubeis, & Hollon, 1999). Similar results have been found with preteens at risk for depression (Gillham, Reivich, Jaycox, & Seligman, 1995; Jaycox, Reivich, Gillham, & Seligman, 1994). Similar secondary prevention interventions might assist at-risk workers in recognizing and challenging their personal negative appraisals, help them conceptualize future experiences differently, and reduce the impact of trauma exposure.

*Increasing adaptive appraisal of mission and task roles.* Because appraisal of positive meaning is associated with resilience to PTEs, preparation should address the ways in which work roles and the larger contexts of work are framed. For example, cognitive therapy techniques might be used to emphasize the importance of a mission and of each participant's role in it. For instance, consider the soldier assigned to body-handling duty following a plane crash. If the task were perceived as "I'm picking up parts of bodies of my buddies, guys just like me," the body handler would likely experience emotions of sadness, helplessness, horror, or fear. If the task were framed with a broader significance such as "I'm providing an honorable service that may be of some comfort to families," he or she would possibly be better able to justify the emotional stress of the work. Similarly, it may be helpful to guide peacekeepers to focus their cognitions on thoughts such as "I am reducing, even by a little, the loss of life from ethnic violence" or "If I can help even one person that will make it worth it" (Litz et al., 1997).

### Reduction of Physiological and Emotional Arousal During the PTE

Theoretically, a number of mechanisms could reduce the intensity of emotional and physiological reactions during exposure to a PTE. Participants would benefit from learning a variety of stress-management skills, such as diaphragmatic breathing, stress-inoculation training (SIT), and muscular-relaxation training (Öst, 1987). Such methods teach participants to decrease physiological arousal via methods of self-instruction, guided imagery, and self-dialogue. An intervention might involve first mastering such methods and then practicing them during realistic stressful training situations. For example, the guided self-dialogue techniques used in SIT (Meichenbaum, 1985) are used for preparation (e.g., Schreiber & Schreiber, 2002) and successfully reduce anxiety and improve performance under stressful conditions (Saunders, Driskell, & Johnston, 1996). These methods involve first teaching individuals to identify unhelpful self-verbalizations, such as "I can't do this" and "I am losing it," and then training them to replace unhelpful self-statements with more adaptive statements, such as "I can handle this" or "I can calmly follow the steps." Individuals then practice implementing a series of personalized statements to help them manage fear and remain focused on the task during realistic training experiences.

Realistic training experiences are an ideal setting for practicing anxiety management because they allow for in vivo use of skills and can result in superior performance compared to "training as usual" (Sarason, Johnson, Berberich, & Siegel, 1979). Interventions that allow participants to monitor their stress levels and provide the opportunity to take a time out during training can help participants learn to deal with the experience of overwhelming stress. Such interventions are also useful to help rule out personnel who might not be appropriate for actual duty. It is interesting that most studies have shown that performance during exposure-type training may offer the most accurate screening for selecting who is likely to do well following PTEs, as traditional mental health screening measures usually create too many false positives (Ursano, Grieger, & McCarroll, 1996).

### Enhancement of Posttrauma Coping

As noted earlier, posttraumatic stress reactions are thought to be shaped in part by behavioral and cognitive coping responses after exposure to trauma (Ehlers & Clark, 2000). Thus, preparation interventions might include training aimed at reducing later problematic coping and increasing potentially effective coping behaviors.

*Reducing maladaptive posttrauma coping.* According to CB theories, behavioral and cognitive avoidant coping strategies prevent resolution of the negative trauma-related appraisals and extinction of conditioned responses. Avoidant coping, such as alcohol or drug "self-medication," for example, can also cause subsequent problems as substance use becomes more chronic and interferes with functioning and relationships. Similarly, social isolation reduces emotional support from others, interferes with important relationships, and limits involvement in activities that have the potential to elicit positive emotions. CBT methods that effectively minimize maladaptive posttrauma coping might also be effective pre-PTE. For example, brief interventions shown to reduce levels of alcohol consumption (Bien, Miller, & Tonigan, 1993; Gentilello et al., 1999) might be delivered prior to work-related trauma exposure to establish positive drinking habits and reduce likelihood of increased intake posttrauma.

*Increasing adaptive coping.* Conversely, preparation efforts might also focus on replacing avoidant coping strategies with more adaptive coping behaviors. Adaptive coping might include use of skills related to obtaining and maintaining social support, problem solving and goal setting, stress management, and help seeking. For example, supportive relationships have been found to buffer against development of PTSD (Andrews et al., 2003; Zoellner, Foa, & Brigidi, 1999). In particular, having at least one person available who is emotionally supportive seems to be more important than the sheer number of acquaintances available to an individual (L. A. King et al., 1998). Conversely, negative social reactions from others are associated with higher levels of PTSD (Ullman & Filipas, 2001; Zoellner et al., 1999). Theories are needed to better understand the key mechanisms in coping so we can better operationalize effective and efficient prevention programs. Such findings suggest that interventions that undertake to help individuals identify supportive others, increase skills of seeking and providing beneficial support, and prevent deterioration of support during and after PTEs would be useful components of systematic worker preparation program.

## FUTURE DIRECTIONS

We believe that systematic, theory-informed prevention interventions can reduce the likelihood that at-risk professionals will develop trauma-related psychopathology. The preparation strategies suggested in this article are intended to stimulate the discussion and development of empirical research programs. The operationalization and testing of specific hypotheses are now needed.

Our review suggests that CB prevention techniques help reduce negative outcomes and provides a conceptual framework for program development. These proposed strategies represent only a small subgroup of theory-informed approaches that could be evaluated. Longitudinal research is needed to examine the CB mechanisms and processes that individuals use prior to, during the course of, and following PTEs. In addition, research is needed to determine whether adaptive mechanisms can be taught in a primary or secondary prevention format. Last, research is needed to evaluate specific variables that causally influence outcomes in various worker populations, work environments, and job-specific PTEs. It is time to identify systematic preparation interventions that can protect those professionals who risk their own well-being as they carry out job duties essential to our society.

## IMPLICATIONS FOR PRACTICE, POLICY, AND RESEARCH

- Posttraumatic stress disorder (PTSD) is associated with perceptions of control and self-efficacy (e.g., Ginzburg et al., 2003), more positive appraisals (e.g., Sutker et al., 2004), fewer negative appraisals (e.g., Bryant & Guthrie, 2005; Ehlers & Clark, 2000), lower emotional arousal during a potentially traumatic event (PTE; e.g., Foa et al., 1982), lower levels of active coping (King et al, 1999), and higher levels of avoidance coping (e.g., Benotsch et al., 2006).

- Interventions should be researched that address perceptions of control and self-efficacy during PTEs, that encourage positive appraisals and help prevent the activation of negative appraisals, that decrease emotional arousal during PTEs, and that increase adaptive or decrease maladaptive coping behavior.
- Intervention examples include psychoeduation about potentially traumatic stimuli, rehearsal of task-related behaviors, mental planning, exposure interventions, cognitive challenging, stress-inoculation interventions, stress management, guided self-dialogue, attentional distraction techniques, behavioral activation, and social skills interventions.

## REFERENCES


Afflect, G., & Tennen, H. (1996). Construing benefits from adversity: Adaptational significance and dispositional underpinnings. *Journal of Personality, 64,* 899-922.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., Text revision). Washington, DC: Author.

Andrews, B., Brewin, C. R., & Rose, S. (2003). Gender, social support and PTSD in victims of violent crime. *Journal of Traumatic Stress, 16*(4), 421-427.

Andrews, B., Brewin, C. R., Rose, S., & Kirk, M. (2000). Predicting PTSD symptoms in victims of violent crime: The role of shame, anger, and childhood abuse. *Journal of Abnormal Psychology, 109,* 69-73.

Bandura, A. (1989). Human agency in social cognitive theory. *American Psychologist, 44,* 1175-1184.

Bandura, A., Reese, L., & Adams, N. E. (1982). Microanalysis of action and fear arousal as a function of differential levels of perceived self-efficacy. *Journal of Personality and Social Psychology, 43,* 5-21.

Bandura, A., Taylor, C. B., Williams, S. L., Mefford, I. M., & Barchas, J. D. (1985). Catecholamine secretion as a function of perceived coping self-efficacy. *Journal of Consulting and Clinical Psychology, 53,* 406-415.

Barlow, D. H. (2002). *Anxiety and its disorders: The nature and treatment of anxiety and panic* (2nd ed.). New York: Guilford.

Bartone, P. (1999). Hardiness protects against war-related stress in army reserve forces. *Consulting Psychology Journal: Practice and Research, 51*(2), 72-81.

Bartone, P. T., Ursano, R. J., & Wright, K. M. (1989). The impact of a military air disaster on the health of assistance workers: A prospective study. *Journal of Nervous and Mental Disease, 177*(6), 317-328.

Basoglu, M., Mineka, S., Paker, M., Aker, T., Livanou, M., & Gok, S. (1997). Psychological preparedness for trauma as a protective factor in survivors of torture. *Psychological Medicine, 27,* 1421-1433.

Basoglu, M., Paker, M., Paker, O., Ozmen, E., Marks, I., Insecu, C., et al. (1994). Psychological effects of torture: A comparison of tortured with non-tortured political activists in Turkey. *American Journal of Psychiatry, 151,* 76-81.

Benotsch, E. G., Brailey, K., Vasterling, J. J., Uddo, M., Constans, J. I., & Sutker, P. B. (2000). War zone stress, personal and environmental resources, and PTSD symptoms in Gulf War veterans: A longitudinal perspective. *Journal of Abnormal Psychology, 109*(2), 205-213.

Berkun, M. (2000). Performance decrement under psychological stress. *Human Performance in Extreme Environments, 5,* 92-97.

Bien, T., Miller, W. R., & Tonigan, J. S. (1993). Brief interventions for alcohol problems: A review. *Addiction, 88,* 315-335.

Blount, R. L., Davis, N., Powers, S. W., & Roberts, M. C. (1991). The influence of environmental factors and coping style on children's coping and distress. *Clinical Psychology Review, 11,* 93-116.

Bolles, R. C., & Fanselow, M. S. (1980). A perceptual-defensive-recuperative model of fear and pain. *Behavioral and Brain Sciences, 3*(2), 291-323.

Brewin, C. R., Dalgleish, T., & Joseph, S. (1996). A dual representation theory of posttraumatic stress disorder. *Psychological Review, 103*(4), 670-686.

Bryant, R. A. (1999). Acute stress disorder following motor vehicle accidents. In E. J. Hickling & E. B. Blanchard (Eds.), *Current understanding, treatment and international handbook of road traffic accidents & psychological trauma* (pp. 29-42). New York: Elsevier.

Bryant, R. A., & Guthrie, R. M. (2005). Maladaptive appraisals as a risk factor for posttraumatic stress. *Psychological Science, 16,* 749-752.

Bryant, R. A., Marosszeky, J. E., Crooks, J., & Gurka, J. A. (2004). Elevated resting heart rate as a predicator of posttraumatic stress disorder after severe traumatic brain injury. *Psychosomatic Medicine, 66,* 760-761.

Butler, L. D., Koopman, C., Azarow, J., Desjardins, J. C., Hastings, T. A., & Spiegel, D. (2002, November). *Distress and resiliency in coping with the tragedy of 9/11/01.* Paper presented at the annual meeting of the International Society of Traumatic Stress Studies, Baltimore.

Carlier, I. V. E., Lamberts, R. D., & Gersons, B. P. R. (1997). Risk factors of posttraumatic stress symptomatology in police officers: A prospective analysis. *Journal of Nervous and Mental Disease, 185*(5), 498-506.

Centers for Disease Control and Prevention. (2002). Injuries and illnesses among New York City Fire Department rescue workers after responding to the World Trade Center attacks. *Morbidity and Mortality Weekly Report: Special Issue, 51,* 1-5.

Chung, M. C., Easthope, Y., & Chung, C. (1999). The relationship between trauma and personality in victims of the Boeing 737-2D6C crash in Coventry. *Journal of Clinical Psychology, 55*(5), 617-629.

Corneil, W., Beaton, R., Murphy, S., Johnson, C., & Pike, K. (1999). Exposure to traumatic incidents and prevalence

of posttraumatic stress symptomatology in urban firefighters in two countries. *Journal of Occupational Health Psychology, 4,* 131-141.

Craske, M. G., & Mystkowski, J. L. (2006). Exposure therapy and extinction: Clinical studies. In M. G. Craske, D. Hermans, & D. Vansteenwegen (Eds.), *Fear and learning: From basic processes to clinical implications* (pp. 217-233). Washington, DC: American Psychological Association.

Dunmore, E., Clark, D. M., & Ehlers, A. (1997). Cognitive factors in persistent versus recovered post-traumatic stress disorder after physical or sexual assault: A pilot study. *Behavioural & Cognitive Psychotherapy, 25,* 147-159.

Dunmore, E., Clark, D. M., & Ehlers, A. (2001). A prospective investigation of the role of cognitive factors in persistent post-traumatic stress disorder (PTSD) after physical or sexual assault. *Behaviour Research and Therapy, 39,* 1063-1084.

Ehlers, A., & Clark, D. M. (2000). A cognitive model of posttraumatic stress disorder. *Behaviour Research & Therapy, 38*(4), 319-345.

Ehlers, A., Maercker, A., & Boos, A. (2000). Posttraumatic stress disorder following political imprisonment: The role of mental defeat, alienation, and perceived permanent change. *Journal of Abnormal Psychology, 109,* 45-55.

Eid, J., & Morgan, C. A., III. (2006). Dissociation, hardiness, and performance in military cadets participating in survival training. *Military Medicine, 171,* 436-442.

Eriksson, C. B., Vande Kemp, H., Gorsuch, R., Hoke, S., & Foy, D. W. (2001). Trauma exposure and PTSD symptoms in international relief and development personnel. *Journal of Traumatic Stress, 14*(1), 205-212.

Foa, E. B., Ehlers, A., Clark, D. M., Tolin, D. F., & Orsillo, S. M. (1999). The Posttraumatic Cognitions Inventory (PTCI): Development and validation. *Psychological Assessment, 11,* 303-314.

Foa, E. B., Steketee, G., & Rothbaum, B. O. (1989). Behavioral/cognitive conceptualizations of post-traumatic stress disorder. *Behavior Therapy, 20,* 155-176.

Foa, E. B., Zinbarg, R., & Rothbaum, B. O. (1992). Uncontrollability and unpredictability in post-traumatic stress disorder: An animal model. *Psychological Bulletin, 112,* 218-238.

Folkman, S., & Moskowitz, J. T. (2000). Positive affect and the other side of coping. *American Psychologist, 55,* 647-654.

Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist, 56*(3), 218-226.

Friedman, M. J. (2002). Future pharmacotherapy for posttraumatic stress disorder: Prevention and treatment. *Psychiatric Clinics of North America, 25*(2), 427-441.

Gardenswartz, C. A., & Craske, M. G. (2001). Prevention of panic disorder. *Behavior Therapy, 32,* 725-738.

Garmezy, N., Masten, A. S., & Tellegen, A. (1984). The study of stress and competence in children: A building block for developmental psychopathology. *Child Development, 55*(1), 97-112.

Geer, J. H., & Maisel, E. (1972). Evaluating the effects of the prediction–control confound. *Journal of Personality and Social Psychology, 23*(3), 314-319.

Gentilello, L. M., Rivara, F. P., Donovan, D. M., Jurkovich, G. J., Daranciang, E., Dunn, C. W., et al. (1999). Alcohol interventions in a trauma center as a means of reducing the risk of injury recurrence. *Annals of Surgery, 230,* 473-483.

Gillham, J. E., Reivich, K. J., Jaycox, L. H., & Seligman, M. E. P. (1995). Preventing depressive symptoms in schoolchildren: Two year follow-up. *Psychological Science, 6,* 343-351.

Ginzburg, K., Solomon, Z., Kekel, R., & Neria, Y. (2003). Battlefield functioning and chronic PTSD: Associations with perceived self-efficacy and causal attribution. *Personality and Individual Differences, 34,* 463-476.

Gold, P. B., Engdahl, B. E., Eberly, R. E., Blake, R. J., Page, W. F., & Frueh, B. C. (2000). Trauma exposure, resilience, social support, and PTSD construct validity among former prisoners of war. *Social Psychiatry and Psychiatric Epidemiology, 35*(1), 36-42.

Goldstein, A. J., & Chambless, D. L. (1978). A reanalysis of agoraphobia. *Behavior Therapy, 9*(1), 47-59.

Gribble, P. A., Cowen, E. L., Wyman, P. A., Work, W. C., Wannon, M., & Raoof, A. (1993). Parent and child views of parent–child relationship qualities and resilient outcomes among urban children. *Journal of Child Psychology & Psychiatry & Allied Disciplines, 34*(4), 507-519.

Himelein, M. J., & McElrath, J. V. (1996). Resilient child sexual abuse survivors: Cognitive coping and illusion. *Child Abuse and Neglect, 20,* 747-758.

Hoge, C. W., Castro, C. A., Messer, S. C., McGurk, D., Cotting, D. I., & Koffman, R. L. (2004). Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. *New England Journal of Medicine, 351,* 13-22.

Inzana, C. M., Driskell, J. E., Salas, E., & Johnston, J. H. (1996). Effects of preparatory information on enhancing performance under stress. *Journal of Applied Psychology, 81,* 429-435.

Jaycox, L. H., Reivich, K. J., Gillham, J., & Seligman, M. E. P. (1994). Prevention of depressive symptoms in school children. *Behaviour Research and Therapy, 32,* 801-816.

Johnson, B. K., & Kenkel, M. B. (1991). Stress, coping, and adjustment in female adolescent incest victims. *Child Abuse and Neglect, 15,* 293-305.

Keane, T. M., Zimering, R. T., & Caddell, J. M. (1985). A behavioral formulation of posttraumatic stress disorder in Vietnam veterans. *Behavior Therapist, 8,* 9-12.

Kent, G. (1997). Dental phobias. In G. C. Davey (Ed.), *Phobias: A handbook of theory, research and treatment* (pp. 107-127). Chichester, UK: Wiley.

King, D. W., King, L. A., Foy, D. W., Keane, T. M., & Fairbank, J. A. (1999). Posttraumatic stress disorder in a national sample of female and male Vietnam veterans: Risk factors, war-zone stressors, and resilience–recovery variables. *Journal of Abnormal Psychology, 108*(1), 164-170.

King, L. A., King, D. W., Fairbank, J. A., Keane, T. M., & Adams, G. A. (1998). Resilience–recovery factors in

post-traumatic stress disorder among female and male Vietnam veterans hardiness, postwar social support, and additional stressful life events. *Journal of Personality and Social Psychology, 74*(2), 420-434.

Kobasa, S. C. (1979). Stressful life events, personality, and health: An inquiry into hardiness. *Journal of Personality and Social Psychology, 37*(1), 1-11.

Kobasa, S. C., Maddi, S. R., & Kahn, S. (1982). Hardiness and health: A prospective study. *Journal of Personality and Social Psychology, 42*(1), 168-177.

Kubany, E. S. (1998). Cognitive therapy for trauma-related guilt. In V. M. Follette, J. I. Ruzek, & F. R. Abueg (Eds.), *Cognitive–behavioral therapies for trauma* (pp. 124-161). New York: Guilford.

Kuch, K. (1989). Treatment of post-traumatic phobias and PTSD after car accidents. In P. A. Keller & S. R. Heyman (Eds.), *Innovations in clinical practice: A source book* (Vol. 8, pp. 263-270). Sarasota, FL: Professional Resources Exchange.

Leitenberg, H., Greenwalk, E., & Cado, S. (1992). A retrospective study of long-term methods of coping with having been sexually abused during childhood. *Childhood Abuse and Neglect, 16*, 399-407.

Litz, B. T., King, L. A., King, D. W., Orsillo, S. M., & Friedman, M. J. (1997). Warriors as peacekeepers: Features of the Somalia experience and PTSD. *Journal of Consulting and Clinical Psychology, 65*, 1001-1010.

Lovibond, P. (2006). Fear and avoidance: An integrated expectancy model. In M. G. Craske, D. Hermans, & D. Vansteenwegen (Eds.), *Fear and learning: From basic processes to clinical implications* (pp. 117-132). Washington, DC: American Psychological Association.

Lubow, R. E. (1998). Latent inhibition and behavior pathology: Prophylactic and other possible effects of stimulus preexposure. In W. O'Donohue (Ed.), *Learning and behavior therapy* (pp. 107-121). Needham Heights, MA: Allyn & Bacon.

Marks, I. M. (1987). *Fears, phobias, and rituals: Panic, anxiety, and their disorders*. New York: Oxford University.

Marmar, C. R., Weiss, D. S., Metzler, T. J., Ronfeldt, H. M., & Foreman, C. (1996). Stress responses of emergency services personnel to the Loma Prieta earthquake Interstate 880 freeway collapse and control traumatic incidents. *Journal of Traumatic Stress, 9*(1), 63-85.

Marsella, A. J., Friedman, M. J., & Gerrity, E. T. (1996). *Ethnocultural aspects of posttraumatic stress disorder: Issues, research and clinical applications*. Washington, DC: American Psychological Association.

Masten, A. S. (2001). Ordinary magic: Resilience processes in development. *American Psychologist, 56*(3), 227-238.

Masten, A. S., & Coatsworth, J. D. (1998). The development of competence in favorable and unfavorable environments: Lessons from research on successful children. *American Psychologist, 53*, 205-220.

McCarroll, J. E., Ursano, R. J., Fullerton, C. S., Oates, G. L., Ventis, W. L., Friedman, H., et al. (1995). Gruesomeness, emotional attachment, and personal threat: Dimensions of the anticipated stress of body recovery. *Journal of Traumatic Stress, 8*(2), 343-349.

McEwen, B. S. (2003). Mood disorders and medical illness: Mood disorders and allostatic load. *Biological Psychiatry, 54*(3), 200-207.

Meichenbaum, D. (1985). *Stress inoculation training*. New York: Pergamon.

Mineka, S., & Zinbarg, R. (2006). A contemporary learning theory perspective on the etiology of anxiety disorders. *American Psychologist, 61*, 10-26.

Morgan, C. A., III, Hazlett, M. G., Wang, S., Richardson, E. G., Schnurr, P., & Southwick, S. M. (2001). Symptoms of dissociation in humans experiencing acute, uncontrollable stress: A prospective investigation. *American Journal of Psychiatry, 158*, 1239-1247.

Morgan, C. A., III, Southwick, S., Hazlett, G., Rasmusson, A., Hoyt, G., Zimolo, Z., et al. (2004). Relationships among plasma dehydroepiandrosterone sulfate and cortisol levels, symptoms of dissociation, and objective performance in humans exposed to acute stress. *Archives of General Psychiatry, 61*, 819-825.

Morgan, C. A., III, Southwick, S., Hazlett, G., & Steffian, G. (2007). Symptoms of dissociation in healthy military populations: Why and how do war fighters differ in response to intense stress? In E. Vermetten, M. Dorahy, & D. Spiegel (Eds.), *Traumatic dissociation: Neurobiology and treatment* (pp. 157-179). Washington, DC: American Psychiatric Publishing.

Morgan, C. A., III, Steffian, G., & Ozbay, F. (2006, November). *Effects of a cognitive intervention on military performance under stress*. Paper presented at the 21st annual convention of the International Society of Traumatic Stress, Hollywood, CA.

North, C. S., Tivis, L., McMillen, J. C., Pfefferbaum, B., Spitznagel, E. L., Cox, J., et al. (2002). Psychiatric disorders in rescue workers after the Oklahoma City bombing. *American Journal of Psychiatry, 159*, 857-859.

Ohman, A., & Mineka, S. (2001). Fears, phobias, and preparedness: Toward an evolved module of fear and fear learning. *Psychological Review, 108*(3), 483-522.

Öst, L. G. (1987). Applied relaxation: Description of a coping technique and review of controlled studies. *Behaviour Research and Therapy, 25*, 397-409.

Paton, D., Smith, L. M., & Stephens, C. (1998). Work-related psychological trauma: A social psychological and organisational approach to understanding response and recovery. *Australasia Journal of Disaster and Trauma Studies, 1*, 1-14.

Pfefferbaum, B., Seale, T. W., Brandt, E. N., Jr., Pfefferbaum, R. L., Doughty, D. E., & Rainwater, S. M. (2003). Media exposure in children one hundred miles from a terrorist bombing. *Annals of Clinical Psychiatry, 15*(1), 1-8.

Rachman, S. (1990). *Fear and courage* (2nd ed.). New York: Freeman.

Reiss, S. (1991). Expectancy model of fear, anxiety, and panic. *Clinical Psychology Review, 11*, 141-153.

Resick, P. A., Nishith, P., & Weaver, T. L. (2002). A comparison of cognitive-processing therapy with prolonged exposure and a waiting condition for the treatment of chronic posttraumatic stress disorder in female rape

victim. *Journal of Consulting and Clinical Psychology, 70*(4), 867-879.

Resick, P. A., & Schnicke, M. K. (1993). *Cognitive processing therapy for rape victims: A treatment manual.* Newbury Park, CA: Sage.

Riggs, D. S., Cahill, S. P., & Foa, E. B. (2006). Prolonged exposure treatment of posttraumatic stress disorder. In V. F. Follette & J. I. Ruzek (Eds.), *Cognitive–behavioral therapies for trauma* (2nd ed., pp. 65-95). New York: Guilford.

Riolli, L., Savicki, V., & Cepani, A. (2002). Resilience in the face of catastrophe: Optimism, personality and coping in the Kosovo crisis. *Journal of Applied Social Psychology, 32*(8), 1604-1627.

Runyan, D. K. (1998). Prevalence, risk, sensitivity, and specificity: A commentary on the epidemiology of child sexual abuse and the development of a research agenda. *Child Abuse & Neglect, 22*(6), 493-498.

Sarason, I. G., Johnson, J. H., Berberich, J. P., & Siegel, J. M. (1979). Helping police officers to cope with stress: A cognitive–behavioral approach. *American Journal of Community Psychology, 7*, 593-603.

Saunders, T., Driskell, J. E., & Johnston, J. H. (1996). The effect of stress inoculation training on anxiety and performance. *Journal of Occupational Health Psychology, 1*(2), 170-186.

Schreiber, E. H., & Schreiber, K. N. (2002). A study of parents of violent children. *Psychological Reports, 90*(1), 101-104.

Seligman, M. E. P., Abramson, L. Y., Semmel, A., & von Baeyer, C. (1979). Depressive attributional style. *Journal of Abnormal Psychology, 88*, 242-247.

Seligman, M. E. P., Castellon, C., Cacciola, J., Schulman, P., Luborsky, L., et al. (1988). Explanatory style change during cognitive therapy for unipolar depression. *Journal of Abnormal Psychology, 97*, 13-18.

Seligman, M. E. P., Schulman, B. S., DeRubeis, R. J., & Hollon, S. D. (1999). The prevention of depression and anxiety [online serial]. *Prevention and Treatment, 2*, article 8.

Sharkansky, E. J., King, D. W., & King, L. A. (2000). Coping with Gulf War combat stress: Mediating and moderating effects. *Journal of Abnormal Psychology, 109*(2), 188-197.

Sharkansky, E. J., King, D. W., King, L. A., Wolfe, J., Erickson, D. J., & Stonkes, L. R. (2000). Coping with Gulf War combat stress mediating and moderating effects. *Journal of Abnormal Psychology, 109*, 188-197.

Silver, R. C., Holman, A., McIntosh, D. N., Poulin, M., & Gil-Rivas, V. (2002). Nationwide longitudinal study of psychological responses to September 11. *Journal of American Medical Association, 288*, 1235-1244.

Smith, P., Perrin, S., Yule, W., & Rabe-Hesketh, S. (2001). War exposure and maternal reactions in the psychological adjustment of children from Bosnia-Herzegovina. *Journal of Child Psychology & Psychiatry & Allied Disciplines, 42*(3), 395-404.

Southwick, S. M., Bremner, D., & Krystal, J. H. (1994). Psychobiologic research in post-traumatic stress disorder. *Psychiatric Clinics of North America, 17*(2), 251-264.

Southwick, S. M., Vythilingam, M., & Charney, D. S. (2005). The psychobiology of depression and resilience to stress: Implications for prevention and treatment. *Annual Review of Clinical Psychology, 1*(1), 255-291.

Sutker, P. B., Davis, J. M., Uddo, M., & Ditta, S. R. (1995). War zone, personal resources, and PTSD in Persian Gulf War returnees. *Journal of Abnormal Psychology, 104*(3), 444-452.

Tomaka, J., Blascovich, J., Kelsey, R. M., & Leitten, C. L. (1993). Subjective, physiological, and behaviroal effects of threat and challenge appraisal. *Journal of Personality and Social Psychology, 65*, 248-260.

Tugade, M. M. (2004). Resilient individuals use positive emotions to bounce back from negative emotional experiences. *Journal of Personal Social Psychology, 86*, 320-333.

Ullman, S. E., & Filipas, H. H. (2001). Predictors of PTSD symptoms severity and social reactions in sexual assault survivors. *Journal of Traumatic Stress, 14*, 369-389.

Ursano, R. J., Grieger, T. A., & McCarroll, J. E. (1996). Prevention of posttraumatic stress: Consultation, training, and early treatment. In B. van der Kolk, A. McFarlane, & L. Weisaeth (Eds.), *Traumatic stress: The effects of overwhelming experience on mind, body, and society* (pp. 441-462). New York: Guilford.

U.S. Army. (2003, December). *Operation Iraqi Freedom Mental Health Advisory Team report.* Retrieved January 2004 from http://www.armymedicine.army.mil/news/mhat/mhat_report.pdf

van der Ploeg, E., Dorresteijn, S. M., & Kleber, R. J. (2003). Critical incidents and chronic stressors at work: Their impact on forensic doctors. *Journal of Occupational Health Psychology, 8*(2), 157-166.

Whealin, J. M., & Ruzek, J. (2004, July). *Prevention and early intervention for work-related trauma.* Paper presented at the 113th convention of the American Psychologist Association, Honolulu, HI.

Zoellner, L. A., Foa, E. B., & Brigidi, B. D. (1999). Interpersonal friction and PTSD in female victims of sexual and nonsexual assault. *Journal of Traumatic Stress, 12*, 689-700.

*Julia M. Whealin received her PhD in clinical psychology from the University of Georgia. She is the deputy director for education and a research health scientist at the Pacific Islands Division of the National Center for Posttraumatic Stress Disorder. Her interests include PTSD prevention, intervention, risk and resilience, and the interaction between ethnocultural factors and mental health.*

*Josef I. Ruzek received his PhD in clinical psychology from the University of New York, Stony Brook. He is the deputy director for education for the National Center for Posttraumatic Stress Disorder, and his office is at the National Center for Posttraumatic Stress Disorder, Education Division, in Menlo Park, California.*

*Steven Southwick received his medical degree from Yale University. He serves as the deputy director for the Clinical Neurosciences Division of the National Center for PTSD. He is professor of psychiatry at the Yale Child Study Center and Yale University School of Medicine.*